



1971

# Eighty-Fourth Annual Report of the Tennessee Agricultural Experiment Station, 1971

University of Tennessee Agricultural Experiment Station

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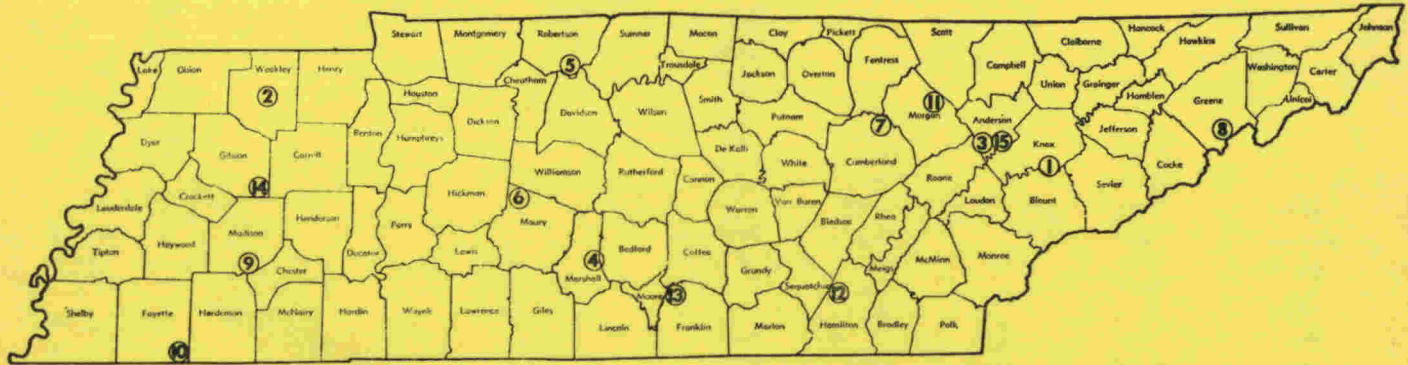
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Eighty-fourth  
Annual Report  
of the  
Tennessee Agricultural  
Experiment Station  
1971

The University of Tennessee  
Knoxville

# THE UNIVERSITY OF TENNESSEE AGRICULTURAL EXPERIMENT STATION



- 1 Main Station
- 2 University of Tennessee at Martin

- 3 U-T/AEC Agricultural Research Laboratory

## Branch Stations

- 4 Dairy Experiment Station
- 5 Highland Rim Experiment Station
- 6 Middle Tennessee Experiment Station
- 7 Plateau Experiment Station
- 8 Tobacco Experiment Station
- 9 West Tennessee Experiment Station

## Field Stations

- 10 Ames Plantation
- 11 Cumberland Forestry Field Station
- 12 Friendship Forestry Field Station
- 13 Highland Rim Forestry Field Station
- 14 Milan Field Station
- 15 Oak Ridge Forest and Arboretum

# **Eighty-fourth Annual Report 1971**

## **Tennessee Agricultural Experiment Station**

**Edward J. Boling** ..... **President of the University**  
**Webster Pendergrass** ..... **Vice President for Agriculture**  
**E. J. Chapman** ..... **Assistant Vice President**  
**John A. Ewing** ..... **Dean**  
**Eric Winters** ..... **Associate Dean**

**The University of Tennessee  
Knoxville**

## LETTER OF TRANSMITTAL

Knoxville, Tennessee  
January 2, 1972

To His Excellency, Winfield Dunn  
Governor of Tennessee

SIR: I have the honor of transmitting herewith, on behalf of the Board of Trustees of the University of Tennessee, a report of the work and expenditures of the Agricultural Experiment Station for the year 1971.

This report is submitted in accordance with the law requiring that such a report be submitted annually by the administrators of the Agricultural Experiment Station to the Governor of the State.

Respectfully submitted,  
Edward J. Boling, President

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# The Eighty-fourth Annual Report of the Tennessee Agricultural Experiment Station 1971

## Foreword

**I**ncluded in this report are listings by departments of the following information:

- 1) Research projects active as of December 31, 1971;
- 2) Research projects terminated during the calendar year 1971;
- 3) Bulletins, articles, and reports prepared by Experiment Station staff members and published during the calendar year 1971.

In addition, this report contains the financial statement for the Agricultural Experiment Station covering the period July 1, 1970, to June 30, 1971. Also included is a list of the Experiment Station personnel for the calendar year 1971.

## Active Projects

As of December 31, 1971, there were 147 Hatch projects and 25 active State projects. Hatch projects are supported in part with Federal-Grant funds made available by Congress to the Agricultural Experiment Stations of the country under the Hatch Act Amended. State projects are supported entirely by University funds.

In addition, there were 12 McIntire-Stennis and 20 University of Tennessee-Atomic Energy Commission projects, and 1 Special Grant project (CSRS).

The headquarters of the Tennessee Agricultural Experiment Station is located on the agricultural campus of the University of Tennessee at Knoxville. The U-T/AEC Agricultural Research Laboratory is located some 20 miles distant at Oak Ridge, Tennessee. In addition, there are other research centers which represent soil and climatic conditions in the major regions of Tennessee. These other research centers are listed at the end of this report, and the locations are shown on the inside front cover.

## FINANCIAL STATEMENT

July 1, 1970-June 30, 1971

## The University of Tennessee Agricultural Experiment Station

Activity	Federal					Non Federal	Totals All
	Hatch Act - Amended Regular	Regional Res.	Co-op Forestry Research	Research Facilities	Specific Grants		
Receipts	\$1,444,141.00	\$274,106.00	\$106,164.20	\$75,000.00	\$21,279.82	\$3,952,360.37	\$5,873,051.39
Expenditures							
Personal Services	\$1,404,544.55	\$256,716.13	\$ 93,967.69		\$ 6,295.79	\$1,513,950.41	\$3,275,474.57
Travel	5,117.21	3,185.42	653.65		228.51	64,397.71	73,582.50
Equipment	7,789.44	11,027.72	9,470.31		1,912.49	345,274.43	375,474.39
Land and Structures				75,000.00		120,217.00	195,217.00
Personnel Benefits					153.44	327,438.72	327,592.16
All Other	26,689.80	3,176.73	2,072.55		3,391.75	1,144,092.71	1,179,423.54
Unexpended Balance*					9,297.84	436,989.39	446,287.23
Totals	\$1,444,141.00	\$274,106.00	\$106,164.20	\$75,000.00	\$21,279.82	\$3,952,360.37	\$5,873,051.39

\* Includes Obligations for Capital Improvements and Working Capital

Many of the projects involving studies of soils, crops, and livestock may include experimental work at one or more of the outlying stations as well as at the Main Station at Knoxville.

### Projects Terminated

During 1971, 20 projects were terminated. Reports on these projects have either been published or are being prepared for publication.

### Publications

Published reports on research of the Tennessee Agricultural Experiment Station appear in Station Bulletins, in Tennessee Farm and Home Science, as well as in professional and technical periodicals and in various popular publications. There were 14 Station Bulletins published during the year, and 3 were reprinted. The number of technical, semi-technical, and popular articles prepared by staff members and published during 1971 was 179. In addition, staff members published 1 Extension-type publication, and 3 regional bulletins.

### AGRICULTURAL BIOLOGY

Proj. No.	Research Project Titles
Hatch 98	Life History, Ecology, and Control of Major Cotton Insects.
Hatch 132	Breeding Disease-Resistant Tobacco.
Hatch 138	Biology and Control of Plant Parasitic Nematodes; Cooperative with the U. S. Department of Agriculture.
Hatch 139	Associations Among Soil Microorganisms as Related to the Incidence and Severity of Plant Diseases (contributing to Regional Proj. S-26).
Hatch 140	Evaluating New Fungicides.
Hatch 203	Control of Insects Attacking Nursery Plants.
Hatch 213	Biology, Distribution, and Control of Corn Insects.
Hatch 241	The Disposition of Pesticides in the Soil (contributing to Regional Proj. S-62).
Hatch 251	Diseases of Small Grains.



Hatch 260	Diseases of Ornamentals and Associated Nursery Crops.
Hatch 263	Snap Bean Diseases.
Hatch 264	Distribution, Biology, and Control of Tobacco Insects.
Hatch 280	Remote Multispectral Sensing in Agriculture; cooperative with the Agronomy, Agricultural Engineering, and Forestry Departments.
Hatch 289	Cotton Diseases.
Hatch 292	Forage Crop Insect Control.
Hatch 294	Engineering Systems for Cotton Production; cooperative with the Agricultural Engineering Department.
Hatch 299	Relation of House Dust Mites to Allergic Reactions in Humans.
Hatch 302	Viruses and Mycoplasma-like Organisms (MPLO) Causing Diseases of Corn (contributing to Regional Proj. S-70).
Hatch 311	Biology and Control of Arthropods on Soybeans (contributing to Regional Proj. S-74).
Hatch 315	Nature and Extent of Variation in Root-Knot and Cyst Nematodes (contributing to Regional Proj. S-76).
Hatch 343	Biology and Culture of Selected Fishes.
Hatch 349	Catfish Breeding, Production, and Marketing (contributing to Regional Proj. S-83).
State 47	Biology of Farm Ponds.

### **Bulletins, Articles, and Reports—1971**

Brasher, Charles, J. A. Mullins, and S. E. Bennett

Electrostatic ULV Spraying for Control of the Boll Weevil. *Journal of Economic Entomology* 64(6):1537-1541, 1971.

Burgess, E. E. and N. B. Shamiyeh

An Improved Method of Flower Thrips Extraction from Rose Flowers. *Journal of Economic Entomology* 64(2):545-546, 1971.

Burgess, E. E. and S. E. Bennett

Mortality and Abnormalities Caused by Gamma Irradiation of Alfalfa Weevil Larvae. *Annals of the Entomological Society of America* 64(1): 88-90, 1971.

Chambers, A. Y.

Lima Bean Stem Anthracnose (*Colletotrichum truncatum*). Fungicide-Nematicide Tests Results of 1970 26:74-75, 1971.

Chambers, A. Y. and C. H. Hadden

Cotton Seedling Disease Control. *Plant Diseases in Tennessee* No. 420, Revised, 1971.

Chambers, A. Y. and T. C. McCutchen

Research and Observations on Cotton Boll Rot in 1970. *Proceedings: 1971 Beltwide Cotton Production Research Conferences*, 1971.

Cherry, E. T. and C. D. Pless

Effect of Carbofuran and Disulfoton on Parasitism of Tobacco Budworms and Hornworms on Burley Tobacco. *Journal of Economic Entomology* 64: 189-190, 1971.

Epps, J. M.

Nematodes of Soybeans. *American Cotton Grower*, February, 1971.

Epps, J. M.

Pickett 71—A New Soybean Variety for Tennessee Soybean Growers. *Tennessee Farm Research*, 1971.

Epps, J. M.

Recovery of Soybean Cyst Nematodes (*Heterodera glycines*) from the Digestive Tracts of Blackbirds. *Journal of Nematology* 3(4):417-419, 1971.

Feldmesser, Julius and J. M. Epps

Estimated Crop Losses from Plant-Parasitic Nematodes in the United States. *Society of Nematologists (USA) Special Publication* No. 1, 1971. Supplement to the *Journal of Nematology*, 1971.

Hilty, J. W. and Beverly Ausmus

Aerial Photographic Study of Plant Diseases. *Tennessee Farm and Home Science Progress Report* 78, June 1971.

Hilty, J. W. and L. M. Josephson

Reaction of Corn Inbreds with Different Cytoplasms to *H. Maydis*. *Plant Disease Reporter* 55:195-198, 1971.

Johnson, Leander F.

Influence of Oat Straw and Mineral Fertilizer Soil Amendments on Severity of Tomato Root Knot. *Plant Disease Reporter* 55:1126-1129, 1971.

Johnson, L. F. and A. Y. Chambers

Environmental Effects on Frequency of Occurrence of Pathogens and Organisms Associated with Cotton Seedlings. *Proceedings: 1971 Beltwide Cotton Production Research Conferences*, 1971.

- Josephson, L. M., C. R. Graves, H. C. Kincer, and J. W. Hilty  
Reductions in Yield of Corn from Southern Corn Leaf Blight. *Plant Disease Reporter* 55:115-118, 1971.
- Matheny, E. L. and E. A. Heinrichs  
Hatching of Sod Webworm Eggs in Relationship to Low and High Temperatures. *Annals of the Entomological Society of America* 64(1):116-119, 1971.
- Miles, J. T., B. J. Demott, S. A. Hinton, M. J. Montgomery, and S. E. Bennett  
Effect of Feeding Carbofuran on the Physiology of the Dairy Cow and on Pesticide Residues in Milk. *Journal of Dairy Science* 54(4):478-480, 1971.
- Pless, C. D., E. T. Cherry, and Herman Morgan, Jr.  
Growth and Yield of Burley Tobacco as Affected by Two Systemic Insecticides. *Journal of Economic Entomology* 64:172-175, 1971.
- Priest, M. F. and C. J. Southards  
Comparative Morphology of Sixteen Isolates of *Meloidogyne incognita*. *Journal of Nematology* 3(4):325-326, 1971.
- Reed, H. E. and A. Y. Chambers  
Effective Control of Loose Smut of Barley with Systemic Fungicides. *Fungicide-Nematicide Tests Results of 1970* 26:130, 1971.
- Reed, H. E. and A. Y. Chambers  
Effective Control of Loose Smut of Wheat with Systemic Fungicides. *Fungicide-Nematicide Tests Results of 1970* 26:150, 1971.
- Reed, H. E. and A. Y. Chambers  
Wheat Leaf Rust Control with Foliar Sprays of Systemic Fungicides. *Fungicide-Nematicide Tests Results of 1970* 26:109, 1971.
- Reed, H. E., A. Y. Chambers, and T. C. McCutchen  
Control of Wheat Leaf Rust by Airplane Applications of a Systemic Fungicide. *Fungicide-Nematicide Tests Results of 1970* 26:109, 1971.
- Shamiyeh, N. B., Stelmon E. Bennett, R. P. Hornsby, and N. L. Woodiel  
Isolation of Mites from House Dust. *Journal of Economic Entomology* 64(1):53-55, 1971.
- Sievert, R. C.  
Effect of Light on Growth and Sporulation of *Colletotrichum destructivum* in Culture. *Phytopathology* 61:911, 1971.
- Sievert, R. C.  
Effect of Time of Inoculation with Potato Virus Y on Yield and Quality of Burley Tobacco. *Phytopathology* 61:588-589, 1971.
- Southards, C. J.  
Effect of Fall Tillage and Selected Hosts on the Population Density of *Meloidogyne incognita*. *Plant Disease Reporter* 55:41-44, 1971.
- Southards, C. J.  
Physiologic Variation of Seventeen Isolates of *Meloidogyne incognita*. *Journal of Nematology* 3(4):330, 1971.

Wilson, J. L. and R. P. Mullett

How to Renovate Your Pond. University of Tennessee Agricultural Extension Service Publication EC 801, 1971.

## AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

Proj. No.	Research Project Titles
Hatch 249	Human Resource Development and Mobility in the Rural South (contributing to Regional Proj. S-61).
Hatch 259	Egg Marketing Systems for the South (contributing to Regional Proj. SM-37).
Hatch 270	The Management of Insurable Risk in Tennessee Agriculture.
Hatch 274	Migration Patterns of the Tennessee Population.
Hatch 281	The Economic Impact of the Wholesome Meat Act on Tennessee's Livestock Industry.
Hatch 283	Potentials of the Beef Production Industry in the South (contributing to Regional Proj. S-67).
Hatch 285	Farm Labor in Tennessee.
Hatch 286	Relationship of Fiber Test Data and Other Factors to Prices Paid for Cotton (contributing to Regional Proj. SM-39).
Hatch 290	Golf Associations in Tennessee.
Hatch 295	Efficiencies in Grocery Wholesaling in Tennessee.
Hatch 303	Regional Income and Employment Effects of Investments in Natural Resources (contributing to Regional Proj. S-71).
Hatch 304	Marketing Organization, Power, Policies and Programs in the Dairy Industry (contributing to Regional Proj. SM-40).
Hatch 312	Economic Evaluation of Alternative Forms of Vertical Coordination in the Livestock-Meat Industry (contributing to Regional Proj. SM-41).
Hatch 316	Predicted Effects of Selected Policy and Technology Changes on the Grain Marketing System (contributing to Regional Proj. SM-42).

Hatch 322	Financial Management Strategies of Farm Business Managers.
Hatch 326	Factors Affecting Utilization and Expansion Potential for Ornamental Plants and Turf (contributing to Regional Proj. SM-44).
Hatch 327	Delineation of Functional Economic Areas in Tennessee.
Hatch 328	Socio-Economic Characteristics of Rural Development Areas in Tennessee.
Hatch 331	Rural Development and the Quality of Life in the Rural South (contributing to Regional Proj. S-79).
Hatch 340	Systems Analysis of the Vegetable Subsector of the Food Industry of the South (contributing to Regional Proj. SM-46).
Hatch 346	Growth of the Farm Firm in Specified Farming Regions of Tennessee.
Hatch 350	Demand for Food (contributing to Regional Proj. SM-45).

### **Projects Concluded in 1971**

<b>Proj. No.</b>	<b>Research Project Titles</b>
Hatch 205	An Economic Appraisal of Agricultural Credit Used by Tennessee Farmers.
Hatch 212	Increasing Efficiency in the Tennessee Vegetable Industry (contributing to Regional Proj. SM-30).
Hatch 226	Income Potentials from Alternative Farm Organizations in Various Types of Farming Areas.
Hatch 252	Demand for Food (contributing to Regional Proj. SM-34).
Hatch 262	Civil Defense and Food Stocks.
Hatch 313	Air Pollution and Economic Loss.
Hatch 318	Estimates of Corn Yield Response to Precipitation Variables in Selected Areas of West Tennessee.

- T-2 (S-38)**      **Reducing the Cost of Producing Cotton Through the Management and Application of Technology (USDA, CSRS Grant 616-15-23).**

### **Bulletins, Articles, and Reports—1971**

- Badenhop, M. B. and Julian E. Holmes**  
Rural Recreation Associations. Tennessee Farm and Home Science Progress Report 77, March 1971.
- Badenhop, M. B. and Julian E. Holmes**  
Costs of Maintaining Golf Courses. Tennessee Farm and Home Science Progress Report 79, September 1971.
- Badenhop, M. B. and Julian E. Holmes**  
Factors Affecting Participation in Golf. Tennessee Farm and Home Science Progress Report 79, September 1971.
- Bauer, Larry L. and John P. Jordan**  
A Statistical Technique for Classifying Loan Applications. Tennessee Agricultural Experiment Station Bulletin 476, March 1971.
- Bauer, Larry L. and C. B. Sappington**  
The Impact of 1960-65 Conditions on Nonfarm Income, Farm Employment, and Mobility, by Race and Sex in Tennessee. Tennessee Agricultural Experiment Station Bulletin 477, March 1971.
- Bauer, Larry L. and James A. Culver**  
Cotton Production Costs and Returns in Tennessee, 1968-1970. Tennessee Farm and Home Science Progress Report 80, December 1971.
- Bomar, William J. and C. B. Sappington**  
Corn Price Differentials in Tennessee, 1961 to 1968. Tennessee Farm and Home Science Progress Report 76, December 1970.
- Dubov, Irving, et al.**  
Area Comparisons of Auction Market Selling Costs and Returns for Cattle and Calves in The South. SCS Bulletin Number 154, March 1971.
- Elam, Thomas E. and C. B. Sappington**  
A Price Prediction Model for Feeder Pigs in Tennessee. Tennessee Agricultural Experiment Station Bulletin 485, September 1971.
- Hicks, B. G. and M. B. Badenhop**  
Optimum Number, Size, and Location of Livestock Auction Markets in Tennessee. Tennessee Agricultural Experiment Station Bulletin 478, March 1971.
- Keller, Luther H. and James M. Anderson**  
Beef Feeding Systems and Optimum Farm Organization for Three Areas of Tennessee. Tennessee Agricultural Experiment Station Bulletin 480, July 1971.

Keller, Luther H.

The Value of Additional Land on a Representative Middle Tennessee Farm. Tennessee Farm and Home Science Progress Report 79, September 1971.

Leuthold, Frank O.

Characteristics of Married Couples Related to Family Size in Tennessee. Tennessee Farm and Home Science Progress Report 77, March 1971.

Leuthold, Frank O.

Level of Living of the Elderly in an East Tennessee County. Tennessee Farm and Home Science Progress Report 78, June 1971.

Sappington, C. B., et al.

The Future of the South in the Soybean Processing Industry, 1975. SCS Bulletin 168, November 1971.

Whatley, T. J.

Outlook 1972—Agriculture. Tennessee Survey of Business, Center for Business and Economic Research, College of Business Administration, University of Tennessee, December 1971.

Wilson, Charles M. and Joe A. Martin

An Interindustry Analysis of the Tennessee Economy Emphasizing Agriculture. Tennessee Agricultural Experiment Station Bulletin 475, January 1971.

## AGRICULTURAL ENGINEERING

Proj. No.	Research Project Titles
Hatch 188	Measurement of Standard Cotton Fiber Properties.
Hatch 204	Factors Affecting Water Yields from Small Watersheds in Tennessee; cooperative with the Agronomy Department, UT/AEC Agricultural Research Laboratory, and the Soil Conservation Service (contributing to Regional Proj. S-53).
Hatch 228	Snap Bean Production Mechanization; cooperative with the Horticulture, Food Technology, Agricultural Biology, and Agricultural Economics Departments.
Hatch 277	Farm Waste Disposal; cooperative with the Dairying, Food Technology, and Sanitary Engineering Departments, and the University of Tennessee Water Resources Research Center.
Hatch 280	Remote Multispectral Sensing in Agriculture; cooperative with the Agronomy, Agricultural Biology, and Forestry Departments.

Hatch 294	Engineering Systems for Cotton Production (contributing to Regional Proj. S-69).
Hatch 324	Equipment for Minimum Tillage Practices.
Hatch 333	Evaluation and Improvement of Low-Cost Rural Housing in Tennessee.
Hatch 338	Reducing Labor and Costs in the Dark-Fired Tobacco Harvest-Curing Operation; cooperative with the Agricultural Biology Department and Highland Rim Experiment Station.
T-3	Quality of Humid Region Cotton Harvested by Mechanical Stripper (USDA, CSRS Grant 816-15-06).
State 7	Electric Treatment of Plant Materials; cooperative with the Agronomy and Food Technology Departments and the U. S. Department of Agriculture.
State 25	Land Forming for Drainage and Furrow Irrigation; cooperative with the West Tennessee Experiment Station and the Soil Conservation Service.

### Projects Concluded in 1971

Proj. No.	Research Project Titles
Hatch 32	Chemical Weed Control; cooperative with the Agronomy and Horticulture Departments.
Hatch 214	Behavioral Responses of Chickens to Environmental Factors; cooperative with the Poultry Department.
State 50	Cotton Production Studies; cooperative with the Agricultural Biology and Agronomy Departments and the Tennessee Farm Bureau.

### Bulletins, Articles, and Reports—1971

- Baxter, D. O., Thomas E. Maddox, and Herschel V. Shirley  
Temperature Preferences of Chicks. Transactions of the American Society of Agricultural Engineers 13(6):788-791, November-December, 1970.
- Brasher, Charles, J. A. Mullins, and S. E. Bennett  
Electrostatic ULV Spraying for Control of the Boll Weevil. Journal of Economic Entomology, 64(6):1537-1541, 1971.



- Cheng, C. C. and K. E. Duckett  
On the Torsion Constant of Cotton Fibers. *Textile Research Journal* 41(4): 298-302, April 1971.
- Duckett, K. E. and Paul Elliott  
Pretensioning in Automatic Strength Testers. *Textile Research Journal* 41(4):373, April 1971.
- Duckett, K. E. and R. S. Krowicki  
Cotton Fiber Tenacity: Some Structural Relationships. *Transactions of the Society of Rheology* 15(2):261-273, 1971.
- Henry, Z. A., K. L. Hertel, K. E. Duckett, and J. N. Grant  
Atmospheric, Chemical and Mechanical Treatment Effects on Cottons Varying in Initial Properties. *American Dyestuff Reporter* 60(9):57-66, September 1971.
- Henry, Z. A., K. L. Hertel, K. E. Duckett, and J. N. Grant  
Atmospheric, Chemical and Mechanical Treatment Effects on Cotton Properties in Processing. *Textile Bulletin* 97(2):26-27 and 30-35, February 1971.
- Infante, A. L., J. A. Mullins, and Z. A. Henry  
An Evaluation of a Laboratory Gin for Processing Cotton. *Tennessee Farm and Home Science Progress Report* 77, January 1971.
- Morgan, A. H., D. G. Brown, and T. H. Thomas  
A Dynamometer for Controlled Exercise of Shetland Ponies. *American Journal of Veterinary Research* 32(7):1091-1095, 1971.
- Mullins, J. A. and Joseph R. Overton  
Volume of Water in Which to Apply Preemergence Herbicides for Cotton. *Tennessee Farm and Home Science Progress Report* 76, December 1970.
- Mullins, J. A., Joseph R. Overton, and Tom McCutchen  
Complete Liquid Fertilizer and Preplant Herbicide Combinations for Cotton and Soybeans. *Tennessee Farm and Home Science Progress Report* 79, September 1971.
- Mullins, J. A., Joseph R. Overton, and Tom McCutchen  
Cotton Defoliation. *Tennessee Farm and Home Science Progress Report* 78, June 1971.
- Sewell, John I.  
Agitation in Liquid Manure Tanks, Livestock Waste Management and Pollution Abatement. *Proceedings: International Symposium on Livestock Wastes, ASAE, St. Joseph, Michigan*, pp. 135-137, 1971.
- Sewell, John I.  
Land Grading for Improved Surface Drainage. *Transactions of the American Society of Agricultural Engineers* 13(6): 1817-1819, 1970.
- Sewell, John I., John R. Owen, and Joe W. High, Jr.  
Cost and Time with Liquid Manure Systems. *Sunbelt Dairyman* 9(4):14-15, April 1971.

**AGRONOMY**

<b>Proj. No.</b>	<b>Research Project Titles</b>
Hatch 28	Moisture Sorption Characteristics of the Major Soils of Tennessee and the Relation of Moisture Tensions to Plant Growth and Fertilizer Utilization.
Hatch 33	Evaluation of the Performance of Varieties of Field Crops.
Hatch 34	Corn Improvement; cooperative with the Agricultural Biology Department and the U. S. Department of Agriculture.
Hatch 38	The Comparative Value and Relative Efficiency of Various Phosphate Fertilizers under Different Soil and Cropping Conditions.
Hatch 42	Potassium Fertilization of Farm Crops on Different Soil Series in Tennessee.
Hatch 47	Establishment and Maintenance of Turf.
Hatch 48	Soil Survey of Tennessee to Help Determine Crop Adaptation and Management Requirements; cooperative with the U. S. Department of Agriculture.
Hatch 56	Trace Elements in Tennessee Agricultural Crops.
Hatch 79	Production and Improvement of Cotton Varieties Suitable to Tennessee Conditions; cooperative with the U. S. Department of Agriculture.
Hatch 163	Culture of Dark Tobacco.
Hatch 164	Nitrogen Fertilization of Farm Crops.
Hatch 183	Crop Response to Liming.
Hatch 186	Forage Crops Management: Establishment, Persistence, and Productivity.
Hatch 208	Breeding for Improvement in Small Grain (wheat, oats, barley, and rye) : cooperative with the Agricultural Biology Department.
Hatch 211	Breeding and Genetics of Forage Crops.
Hatch 224	Physiological Responses of Forage Crops to Management and Environment.

- Hatch 237      The Disposition of Pesticides in the Soil (contributing to Regional Proj. S-62).
- Hatch 245      Effects of Pesticides on Turf Pests and Turfgrasses.
- Hatch 250      Influence of Mineralogy of Southern Soils on Certain Chemical and Physical Reactions.
- Hatch 255      Fertilization, Soil and Crop Management Systems, Cultural Practices, and Plant Bed Management Systems for Burley Tobacco; cooperative with U. S. Department of Agriculture.
- Hatch 256      Burley Tobacco Breeding; cooperative with U. S. Department of Agriculture.
- Hatch 279      Selectivity and Mode of Action of Herbicides.
- Hatch 280      Remote Multispectral Sensing in Agriculture; cooperative with the Agricultural Biology, Agricultural Engineering, and Forestry Departments.
- Hatch 287      Effectiveness and Efficiency of Physical and Chemical Mutagens; cooperative with UT/AEC Agricultural Research Laboratory.
- Hatch 291      Plant Constituents Controlling Cotton Fiber Initiation, Growth and Maturation; cooperative with the U. S. Department of Agriculture.
- Hatch 293      Phenology and Physiology of Soybeans.
- Hatch 296      Environment-Management Interactions in Forage Crops Ecological Systems.
- Hatch 301      Viruses and Mycoplasma-like Organisms (MPLO) Causing Diseases of Corn (contributing to Regional Proj. S-70); cooperative with U. S. Department of Agriculture.
- Hatch 320      Weed Control in Agronomic Crops.
- Hatch 335      Herbicide Movement from Application Sites and Effects on Non-Target Species (contributing to Regional Proj. S-78).
- Hatch 337      Diagnosis and Correction of Zinc Problems in Corn and Rice Production (contributing to Regional Proj. S-80).

- Hatch 341      Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality (contributing to Regional Proj. S-82).
- State 60      Soybean Production Potentials and Production Economics of Some Major Tennessee Soils.

### Project Concluded in 1971

- State 50      Quality Cotton Varietal Adaptation.

### Bulletins, Articles, and Reports—1971

Barber, W. D.

Forage Breeding Research in Tennessee—1971. Report of the 28th Southern Pasture and Forage Crop Improvement Conference, Oklahoma State University, Stillwater, Oklahoma, July 6, 1971.

Callahan, L. M.

Are Diseases Really to Blame? Proceedings: 5th Annual Tennessee Turfgrass Conference, January 1971.

Callahan, L. M.

Turfgrasses for Golf Courses in Tennessee. Tennessee Section, Professional Golfers Association Yearbook, January 1971.

Callahan, L. M.

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### ANIMAL HUSBANDRY-VETERINARY SCIENCE

Proj. No.	Research Project Titles
Hatch 52	The Evaluation of Different Pasture Species in Various Combinations and at Varying Rates of Nitrogen Fertilization as Reflected in Beef Cattle Gains and Forage Yields.
Hatch 61	The Improvement of the Producing Ability of Beef Cattle; cooperative with the Aluminum Company of America.
Hatch 68	Carcass Value Investigations with Beef; cooperative with the Food Science and Institution Management Department.
Hatch 71	Factors Affecting Feed Utilization by Ruminants.
Hatch 72	Evaluation of Roughages for Beef Cattle.
Hatch 218	Performance of Beef Cows as Affected by Initial Winter Condition and Level of Winter Feeding.
Hatch 257	Effects of Levels of Fatness on Beef Carcass Quality; cooperative with the U. S. Department of Agriculture.
Hatch 266	Reproductive Capacity of Beef Cows as Related to Germ Cell Complement.
Hatch 306	Breeding Methods for Beef Cattle in the Southern Region; cooperative with the U. S. Department of Agriculture (contributing to Regional Proj. S-10).



- Hatch 307      Efficiency of Beef Production—Amount of Variation and Criteria for Improvement; cooperative with the U. S. Department of Agriculture.
- Hatch 309      Nutrition of the Gravid Gilt with Emphasis on Gestation Effects Upon Progeny Performance.
- Hatch 310      The Relationship of Body Length to Economically Important Traits in Meat-Type Swine.
- Hatch 317      Feeding Programs for Maximum Efficiency and Optimum Body Composition in Meat-Type Swine.
- Hatch 321      Hypomagnesemia Relationship to Grass Tetany in Ruminant Animals.
- Hatch 325      Endocrinology of Reproduction in Cattle; cooperative with the UT/AEC Agricultural Research Laboratory.
- Hatch 339      Mineral Studies in Large Animals Using Radiation and Radioisotope Tracers; cooperative with the UT/AEC Agricultural Research Laboratory.
- Hatch 344      Use of Slaughter By-Products and Extenders in Sausage Manufacturing.
- Hatch 345      Evaluation of Beef Cow-Calf Management Systems as Measured by Production on Various Grazed and Harvested Forages.
- Hatch 351      Effect of Silage Quality on the Performance of Slaughter Animals.
- State 2        Swine Testing; in cooperation with the UT Agricultural Extension Service.
- State 3        Effects of Fluorine Levels of Soil and Water on Grazing Cattle Under Different Systems of Management.
- State 20       Evaluation of Methods of Producing Beef.
- State 39       The Effects of Feedlot Design on the Performance of Slaughter Cattle.
- State 40       Frequency of Winter Feeding of Beef Cows.
- State 42       Beef Cattle Improvement.

- State 52      Evaluation of Meat from Animals Exposed to Lethal Radiation Levels.
- State 55      Maternal Nutrition (Mn-Cu) and Placental Transfer in Ewes (NSF-7676).
- State 59      Bull Evaluation.

### Projects Concluded in 1971

- Hatch 63      Mineral Metabolism in Animals: I. Absorption, Distribution, and Physiological Behavior of Calcium and Phosphorus in Farm Animals; cooperative with the UT/AEC Agricultural Research Laboratory.
- Hatch 66      The Effects of Radiation on Reproductive Physiology in Farm Animals; cooperative with the UT/AEC Agricultural Research Laboratory.
- Hatch 73      The Improvement of the Producing Ability of Swine Through Performance Testing and Breeding Methods.
- Hatch 176      Performance of Growing-Finishing Swine on Concrete and Pasture.

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**CHILD DEVELOPMENT AND FAMILY RELATIONSHIPS**

<b>Proj. No.</b>	<b>Research Project Titles</b>
Hatch 265	Influences on Occupational Goals of Young People (contributing to Regional Proj. S-63).

**Bulletins, Articles, and Reports—1971**

Reed, Helen and Phyllis Ilett

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**DAIRYING**

<b>Proj. No.</b>	<b>Research Project Titles</b>
Hatch 92	Effects of Maximum Selection Pressure for Milk Production on Rate of Improvement in Production and Its Effect on Other Dairy Cattle Traits; co-operating with the U. S. Department of Agriculture (contributing to Regional Proj. S-49).
Hatch 161	Efficient and Economical Use of Forages in Dairy Cattle Rations; co-operating with the U. S. Department of Agriculture.
Hatch 165	Quality and Shelf Life of Dairy Products in the Marketing Channels.
Hatch 268	The Identification and Control of Factors Affecting Reproductive Performance in the Bovine Female.
Hatch 278	Relationship Between Lactose Concentration and Flavor in Dairy Products.
Hatch 282	Studies on the "Lack Freshness" Flavor of Cottage Cheese.
Hatch 284	Factors Affecting the Rate of Genetic Improvement of Dairy Cattle.
Hatch 297	Feed Requirements for Growth of Heifers.
Hatch 298	Bovine Mammary Gland Development During Gestation and Initial Stages of Lactation.
Hatch 305	Fortification of Milk with Iron.

- Hatch 323      Relationship Between Properties of Southern Forages and Animal Responses (contributing to Regional Proj. S-45).
- Hatch 334      Microwave Pasteurization of Milk.
- Hatch 336      Light-Induced Flavor Changes in Milk Packaged in Plastic.

### **Project Concluded in 1971**

<b>Proj. No.</b>	<b>Research Project Titles</b>
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| Hatch 308 | Effect of Dietary Iodine on Thyroxine Secretion Rate of Lactating Cows. |
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## FOOD SCIENCE AND INSTITUTION ADMINISTRATION

Proj. No.	Research Project Titles
Hatch 244	Effect of Cooking Temperature on Yield, Palatability, and Microbiology of Meat; cooperative with the Animal Husbandry-Veterinary Science and Food Technology Departments.
Hatch 269	Effect of Elaidinization on Functional Properties of Fat.

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- Bayne, B. H., S. S. Strawn, C. W. Hutton, W. R. Backus, and B. H. Meyer  
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- Ostrander, A. J., J. K. Abbott, and A. M. Campbell  
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## FOOD TECHNOLOGY

Proj. No.	Research Project Titles
Hatch 173	Group D. and Other Streptococci in Frozen Foods.
Hatch 177	Flavonoid Pigments and Their Degradation in Processed Fruit and Vegetable Products.

- Hatch 193      Enzymes as Related to Chemical and Physical Characteristics of Vegetables for Freezing.
- State 83        Evaluation for Freezing of Fruit and Vegetable Varieties Adapted to Production in Tennessee.

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- Reddy, P. J., J. L. Collins, I. E. McCarty, and M. R. Johnston  
Sensory Evaluation of Breaded, Deep-Fried Turnip Slices. *Food Product Development* 4(8):38, 1971.

### FORESTRY

- | Proj. No. | Research Project Titles   |
|-----------|---|
| Hatch 102 | Forest Management; cooperative with the Tennessee Game and Fish Commission.         |
| Hatch 103 | A Study of Tree Species Adapted to the Different Forest Regions of Tennessee.       |
| Hatch 107 | Relationship of Soil and Other Site Factors to Forest Composition and Productivity. |
| Hatch 185 | Forest Tree Genetics (contributing to Regional Proj. S-23).                         |
| Hatch 207 | Forest Tree Fertilization; cooperative with the Hiwassee Land Company.              |

Hatch 271		Forest Tree Breeding.
Hatch 280		Remote Multispectral Sensing in Agriculture; co-operative with the Agricultural Biology, Agricultural Engineering, and Agronomy Departments.
MS	2	Effects of Fertilization and Irrigation on Tree Growth.
MS	3	Quail Management on Forest and Associated Lands in West Tennessee.
MS	6	Wood Duck Ecology on Rivers and Impoundments in East Tennessee.
MS	7	Blight Resistance in American Chestnut.
MS	8	Christmas Tree Breeding.
MS	9	Characteristics of Juvenile and Branch Wood in Hardwoods.
MS	10	Economics of Alternative Timber-Growing Practices in Tennessee Hardwood Stands.
MS	11	Physiological Response of Wildlife to Different Forest and Associated Habitats; cooperative with the Great Smoky Mountains Natural History Association.
MS	12	Ecology and Behavior of the Black Bear ( <i>Ursus americanus</i> ) in the Great Smoky Mountains National Park.
MS	13	Characteristics of Campers in Forest Recreation Areas in Tennessee; cooperative with the Tennessee Department of Conservation.
MS	14	Effect of Seedling Root Deformation on Growth and Allocation of Auxins.
MS	15	Mycorrhizae for Biological Control of Soil-borne Fungi.
State 8		Wood Preservation.
State 12		Fertilization of Shade Trees on Lawns; cooperative with the Horticulture Department.
State 30		The University of Tennessee Arboretum.



- State 49      Control of Vole Damage to Virginia Pine; cooperative with the Hiwassee Land Company.
- State 53      Quality and Yield of Flooring from Graded Red Oak; cooperative with the U. S. Department of Agriculture.
- State 61      Forest Response to Management Intensities.
- State 63      Ecological and Economic Implications of Improving Wildlife Habitat on Farms in Tennessee.

### Projects Concluded in 1971

- MS      4      Determinants of Forest-Management Intensity of Private, Nonindustrial Owners in the Tennessee Valley Counties of Tennessee.
- MS      5      The Recreation Resources of Large Private Forest Ownerships in Tennessee.

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Summer Food Habits of Juvenile Wood Ducks in East Tennessee. *Journal of Wildlife Management* 35(2):286-292, 1971.

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## HORTICULTURE

Proj. No.	Research Project Titles
Hatch 123	Mineral Nutrition of Vegetable Crops.
Hatch 125	Mineral Nutrition of Fruit Crops.
Hatch 126	Vegetable Variety Investigations.
Hatch 127	Fruit Variety Investigations.
Hatch 128	Propagation of Fruit and Ornamental Plants.
Hatch 154	Kind and Variety Investigations of Ornamentals.
Hatch 157	Management and Evaluation of Plants for Hedges, Screens and Windbreaks.
Hatch 174	Strawberry Breeding for Climatic Adaptability.
Hatch 187	Storage and Handling of Evergreen Nursery Stock.
Hatch 319	Methods of Mutagenesis to Produce Morphological Changes in Plant and Fruit in Tomato and Snap Bean.
State 12	Fertilization of Shade Trees in Lawns; cooperative with the Forestry Department.
State 27	Crop Ecology.
State 57	Evaluation of New Plants.

### Bulletins, Articles, and Reports—1971

- Brown, James F. and Homer D. Swingle  
Spinach Varieties for West Tennessee. Tennessee Farm and Home Science Progress Report 80, December 1971.
- Coffey, David L.  
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- Coffey, David L. and Charles A. Mullins  
Snap Bean Response to Zinc Fertilization as Influenced by Lime. Tennessee Farm and Home Science Progress Report 79, September 1971.
- Coffey, David L. and Charles A. Mullins  
Weed Control in a High Density Planting of Apples. Tennessee Farm and Home Science Progress Report 79, September 1971.

**Mullins, Charles A. and Homer D. Swingle**

Evaluating Lima Bean Varieties for Machine Harvest on the Cumberland Plateau. Tennessee Farm and Home Science Progress Report 80, December 1971.

**Collins, J. L., I. E. McCarty, and H. D. Swingle**

Shelling Mature, Green Soybeans with a Roller-Type Sheller. Tennessee Farm and Home Science Progress Report 78, June 1971.

**Freeland, Robert D. and Homer D. Swingle**

Effect of Storage Periods on the Color of Machine Harvested Southern Peas. Tennessee Farm and Home Science Progress Report 80, December 1971.

### NUTRITION

Proj. No.	Research Project Titles
Hatch 108	Measurement and Interpretation of Bone Density.
Hatch 234	Effect of Organo-Phosphorus Insecticides on the Fixation of Sulfate by Mucopolysaccharides.
Hatch 267	Nutritional Interrelationships of Minerals and Other Nutrients (contributing to Regional Proj. S-64).
Hatch 314	The Effect of Nutrition on Biological Aging in the Rat.
State 18	Mucopolysaccharides and Cellular Lipoprotein Vitamin E Deficiency.

### Bulletins, Articles, and Reports—1971

**Tucker, Sarah M., Rossie L. Mason, and Roy E. Beauchene**

Nutrition for Head Start. School Lunch Journal 25:30-36, 1971

### POULTRY

Proj. No.	Research Project Titles
Hatch 155	Photoperiodism and Physiological Functions of Chickens.
Hatch 216	Xanthophyll in Poultry Pigmentation.
Hatch 233	The Nutrition of Egg-Production-Type Chickens.
Hatch 258	The Pathogenicity of Selected Salmonellas for Chickens.

Hatch 300	Role of the Ultimobranchial Gland in Avian Osteoporosis.
Hatch 342	Mineral Nutrition—Layers.
State 1	Random Sample Testing of Chickens Available to Tennessee Poultrymen.

### Projects Concluded in 1971

Hatch 144	Influence of Environment on Performance of Hens.
Hatch 160	Improving Diets for Broilers and Roasters.
Hatch 214	Behavioral Responses of Chickens to Environmental Factors; cooperative with the Agricultural Engineering Department.
Hatch 261	The Effects of Gumboro on Chickens.

### TEXTILES AND CLOTHING

Proj. No.	Research Project Titles
Hatch 288	Evaluation of Certain Flame Retardant Finishes.

### UNIVERSITY OF TENNESSEE-ATOMIC ENERGY COMMISSION AGRICULTURAL RESEARCH LABORATORY

Proj. No.	Research Project Titles
UT-AEC 1	The Effect of Radiation on Prenatal Development.
UT-AEC 2	Effects of Prenatal Irradiation on Growth.
UT-AEC 3	Transfer of Materials Across the Maternal-Fetal Membrane and Fetal Development in Domestic Animals.
UT-AEC 4	Effects of Radiation on the Reproductive System.
UT-AEC 5	Effects of Radiation on Lifetime Reproduction.
UT-AEC 6	Effect of Dose Rate and Total Dose of Gamma Irradiation Upon Metabolic Parameters in Birds.
UT-AEC 7	Late Effects of Whole-Body Gamma and Mixed Neutron-Gamma Irradiation on Large Animals.

- UT-AEC 8 Late Effects of Whole-Body Gamma Irradiation on the Work Performance and Related Physiology of Shetland Ponies.
- UT-AEC 9 Tissue Culture Studies in Large Animals.
- UT-AEC 10 Radiation Studies in Livestock Under Simulated Fallout Conditions.
- UT-AEC 11 Correlation of Depth Dose Distribution Patterns with Biological Effects in Swine for  $^{60}\text{Co}$  Gamma Rays, 14 MeV Neutrons and Fission Neutrons.
- UT-AEC 12 Early Effects of 14 MeV Neutron Irradiation in Swine.
- UT-AEC 13 Metabolism of Trace Elements.
- UT-AEC 14 Radioiodine and Large Animals.
- UT-AEC 15 Absorption of Minerals in Relation to Gastrointestinal Tissue and Ingesta Characteristics in Dairy Cattle.
- UT-AEC 16 Metabolic Effects of Gastrointestinal and Skin Radiation Injury.
- UT-AEC 17 Exchange Diffusion.
- UT-AEC 18 Mutagenic Effectiveness, Efficiency and Specificity.
- UT-AEC 19 Control and Modification of Seed Radiosensitivity.
- UT-AEC 20 Radiation Studies on Food Crops Under Simulated Fallout Conditions.

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Bell, M. C.

Effects of Radiation Damage on Zinc Metabolism. Proceedings: Panel, Vienna, Austria, 1971, Organized by Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture, "Mineral Studies with Isotopes in Domestic Animals." International AEA, 1971.

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- Bell, M. C., L. B. Sasser, J. L. West, L. Wade, D. D. Killion, and M. J. Constantin  
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Effects of Season and Grass Tetany on Mineral Composition of Hereford Cattle Hair. American Journal of Veterinary Research 32(10):1613-1619, 1971.
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The Postnatal Response of Four Organs to Prenatal Irradiation as Measured by Changes in Nucleic Acids and Proteins. *Radiation Research* 48:368-376, 1971.

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Sasser, L. B., M. C. Bell, L. Wade, Jr., and G. E. Jarboe

Effects of Radiation on Zinc Metabolism of Sheep. *Radiation Research* 46(1):115-128, 1971.

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Pathology of Gastrointestinal-Tract Beta-Radiation Injury. Proceedings: Symposium, "Survival of Food Crops and Livestock in Event of Nuclear War." Brookhaven National Laboratory, 1971.

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## THE UNIVERSITY OF TENNESSEE AT MARTIN

Proj. No.	Research Project Titles
Hatch 33	Evaluation of the Performance of Varieties of Field Crops; cooperative with the Agronomy Department.
Hatch 71	Factors Affecting Feed Utilization by Ruminants; cooperative with the Animal Husbandry-Veterinary Science Department.
Hatch 72	Evaluation of Roughages for Beef Cattle; cooperative with the Animal Husbandry-Veterinary Science Department.
Hatch 161	Efficient and Economical Use of Forages in Dairy Cattle Rations; cooperative with the Dairying Department.
Hatch 186	Forage Crops Management: Establishment, Persistence, and Productivity; cooperative with the Agronomy Department.
Hatch 211	Breeding and Genetics of Forage Crops; cooperative with the Agronomy Department.

Hatch 213      Biology, Distribution, and Control of Corn Insects; cooperative with the Agricultural Biology Department.

**Proj. No.                      Research Project Titles**

Hatch 323      Relationship Between Properties of Southern Forages and Animal Responses; cooperative with the Dairy-ing Department.

State 60      Economic Study of Soybean Production and Soybean Production Potential of Some Major Tennessee Soils; cooperative with the Agronomy Department.

**Bulletins, Articles, and Reports—1971**

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Milan Field Station, Milan, Tom C. McCutchen, Manager  
 Oak Ridge Forest and Arboretum, Oak Ridge, J. S. Kring, Manager

## APPOINTMENTS, TERMINATIONS, LEAVES, CHANGE OF TITLES

### Appointments

John L. Adrian, Graduate Research Assistant in Agricultural Economics, August 23, 1971  
 Mia Armitage, Graduate Research Assistant in Food Science, September 1, 1971  
 Gary M. Boring, Graduate Research Assistant in Agronomy, September 16, 1971  
 Joseph A. Brasher, Graduate Research Assistant in Agricultural Economics, September 16, 1971  
 Larry D. Carver, Graduate Research Assistant in Animal Husbandry, January 1, 1971  
 Edward T. Cherry, Assistant Professor of Agricultural Biology, September 1, 1971  
 Richard U. Clark, Graduate Research Assistant in Agronomy, January 1, 1971

Russell A. Cox, Graduate Research Assistant in Forestry, January 1, 1971  
 David H. Cress, Graduate Research Assistant in Forestry, September 1, 1971  
 Hugh G. Dorminy, Jr., Graduate Research Assistant in Agricultural Economics, September 1, 1971  
 H. H. Dowlen, Graduate Research Assistant in Dairying, January 1, 1971  
 David K. Glover, Graduate Research Assistant in Agronomy, September 16, 1971  
 Larry Heatherly, Graduate Research Assistant in Agronomy, January 1, 1971  
 Jesse S. Hickey, Graduate Research Assistant in Agronomy, January 1, 1971

<sup>1</sup>In cooperation with the U.S. Department of Agriculture.

- R. D. Holder, Graduate Research Assistant in Dairying, September 16, 1971
- Stanley T. Hord, Graduate Research Assistant in Food Technology, June 1, 1971
- Philip P. Hunter, Graduate Research Assistant in Agricultural Biology, June 7, 1971
- Tommy Morris Jones, Graduate Research Assistant in Agricultural Economics, September 1, 1971
- W. H. Kilgore, Graduate Research Assistant in Agricultural Engineering, September 20, 1971
- Donald T. Lafferty, Assistant Professor of Animal Husbandry, October 11, 1971
- Frank D. Masincup, Assistant Professor of Animal Husbandry, February 15, 1971
- Merle R. Menegay, Graduate Research Assistant in Agricultural Economics, September 16, 1971
- Paulette Milligan, Graduate Research Assistant in Textiles and Clothing, September 1, 1971
- S. Darrell Mundy, Instructor of Agricultural Economics, March 1, 1971
- David M. Ostermeier, Assistant Professor of Forestry, October 15, 1971
- Marjorie Porter, Graduate Research Assistant in Food Science, September 1, 1971
- Terry K. Porter, Graduate Research Assistant in Agronomy, July 1, 1971
- J. W. Rugh, Graduate Research Assistant in Agricultural Engineering, January 1, 1971
- Jane Shellabarger, Graduate Research Assistant in Food Science, September 1, 1971
- Carl Wayne Smith, Graduate Research Assistant in Agronomy, September 1, 1971
- Rodney Strand, Graduate Research Assistant in Agronomy, March 15, 1971
- L. K. Stuart, Research Assistant in Agricultural Engineering, April 16, 1971
- J. C. Taylor, Graduate Research Assistant in Food Technology, June 1, 1971
- Michael K. Wade, Graduate Research Assistant in Agronomy, September 1, 1971
- L. R. Wilhelm, Assistant Professor of Agricultural Engineering, September 1, 1971

### Terminations

- Ann Akin, Assistant in Food Science, August 31, 1971
- William A. Alexander, Assistant in Agronomy, June 15, 1971
- John R. Anania, Graduate Research Assistant in Agricultural Economics, October 31, 1971
- Beverly S. Ausmus, Assistant in Agricultural Biology, March 31, 1971
- William H. Baker, Assistant in Forestry, August 31, 1971
- Edward D. Baldwin, Assistant in Agronomy, September 30, 1971
- Gary M. Boring, Graduate Research Assistant in Agronomy, December 31, 1971
- Amelia Brown, Assistant in Food Science, August 31, 1971
- Ludwick E. Brown, Assistant in Agricultural Engineering, December 8, 1971
- Richard U. Clark, Graduate Research Assistant in Agronomy, May 31, 1971
- Donald L. Cline, Assistant in Agricultural Economics, November 30, 1971

- Jack H. Collier, Assistant in Forestry, December 31, 1971
- Michael L. Countess, Assistant in Forestry, December 31, 1971
- Warren C. Couvillion, Sr., Graduate Research Assistant in Agricultural Economics, August 31, 1971
- James I. Eisler, Graduate Research Assistant in Agricultural Biology, December 31, 1971
- Jerry Frady, Assistant in Agronomy, October 31, 1971
- Michael Fuchs-Carsch, Graduate Research Assistant in Agricultural Economics, March 31, 1971
- Clark D. Garland, Assistant in Agricultural Economics, March 31, 1971
- Larry Gittins, Graduate Research Assistant in Agronomy, January 31, 1971
- Frank M. Goode, Assistant Professor of Agricultural Economics, July 31, 1971
- G. M. Gorman, Assistant in Dairy Science, January 15, 1971
- Marilyn Haga, Assistant in Food Science, August 31, 1971
- Aurelio L. Infante, Research Assistant in Agricultural Engineering, June 30, 1971
- R. C. Jordan, Graduate Research Assistant in Dairying, December 27, 1971
- Dwight A. Kaufman, Assistant in Animal Husbandry, November 6, 1971
- Frank D. Kirkpatrick, Assistant in Animal Husbandry, March 15, 1971
- Hollis R. Large, Assistant in Forestry, March 31, 1971
- Charles R. Leslie, Assistant in Agronomy, August 18, 1971
- Daniel A. Linton, Assistant in Agricultural Economics, August 15, 1971
- J. B. Mailhes, Assistant in Animal Husbandry, August 9, 1971
- Dan M. Manning, Assistant in Agronomy, July 31, 1971
- Ellis L. Matheny, Jr., Assistant in Agricultural Biology, June 30, 1971
- Walter L. Montgomery, Graduate Research Assistant, June 15, 1971
- Kenneth W. Paxton, Graduate Research Assistant in Agricultural Economics, March 31, 1971
- Jimmy E. Pendergrass, Assistant in Agricultural Biology, December 31, 1971
- Garey B. Perkins, Graduate Research Assistant, June 22, 1971
- Dennis R. Roop, Assistant in Food Technology, July 1, 1971
- William G. Russell, Assistant Professor of Agricultural Biology, June 30, 1971
- J. C. Souto, Professor, UT/AEC Agricultural Research Laboratory, June 30, 1971
- Yasuomi Tanaka, Post-Doctoral Research Associate in Forestry, May 12, 1971

### Change of Title

- Larry L. Bauer, to Associate Professor of Agricultural Economics, July 1, 1971
- J. K. Bletner, to Professor of Poultry, July 1, 1971
- William F. Byrne, to Assistant Professor, UT/AEC, July 1, 1971
- Charles C. Chamberlain, to Professor of Animal Husbandry, July 1, 1971
- Albert Y. Chambers, to Associate Professor of Agricultural Biology, July 1, 1971
- Milton J. Constantin, to Professor, UT/AEC, July 1, 1971
- Henderson M. Crowder, to Research Instructor of Animal Husbandry, August 1, 1971
- Ralph W. Dimmick, to Associate Professor of Forestry, July 1, 1971

Marvis E. Fryer, to Research  
Instructor of Animal Husbandry,  
August 1, 1971  
Ralph F. Hall, to Associate Professor,  
UT/AEC, July 1, 1971  
Luther H. Keller, to Professor of  
Agricultural Economics, July 1,  
1971  
James B. McLaren, to Associate  
Professor of Animal Husbandry,  
July 1, 1971  
Benny R. McManus, to Associate  
Professor of Agricultural  
Economics, July 1, 1971

Charles A. Mullins, to Instructor of  
Horticulture, September 1, 1971  
Charles D. Pless, to Associate  
Professor of Agricultural Biology,  
July 1, 1971  
Gary E. Spalding, to Associate  
Professor, UT/AEC, July 1, 1971  
Eyvind Thor, to Professor of  
Forestry, July 1, 1971  
R. L. Tugwell, to Professor and  
Acting Head, Poultry Department,  
September 1, 1971

### Retirements

S. A. Hinton, Associate Professor of  
Dairying, December 31, 1971  
Phyllis Ilett, Associate Professor  
Emeritus, Home Management,  
Equipment, and Family Economics,  
September 1, 1971

Thomas J. Longwell, Assistant  
Professor of Agronomy,<sup>1</sup>  
November 30, 1971  
Kenneth B. Sanders, Assistant  
Professor of Agronomy, December  
31, 1971

### Returned from Leave

O. H. Long, Professor of Agronomy  
(Advisor in Soil Science 4 years,

UT India Program), December  
1, 1971

### Leave of Absence

James F. Brown, Assistant Professor  
of Horticulture, November 1, 1971

### Deceased

Frank S. Chance, Emeritus Director  
of the Agricultural Experiment  
Station, April 15, 1971  
O. E. Goff, Professor and Head of  
the Department of Poultry, July  
15, 1971

Charles S. Hobbs, Professor and Head  
of the Department of Animal  
Husbandry-Veterinary Science,  
December 25, 1971